

REMARKS

The Examiner objects to claims 19 and 20, stating that these method claims depend from apparatus claim 6. Applicants have amended these claims, as shown above, to now depend from method claim 9. It is therefore respectfully urged that this objection has been overcome by the instant amendment.

The Examiner has subjected this application to restriction under 35 U.S.C. 121. The Examiner has formed two groups of claims, Group I directed to claims 1-8 and drawn to a reactor, and Group II directed to claims 9-18 and drawn to a method for oxidation of ethylene, using such a reactor. The Examiner has asserted that these groups of claims represent distinct inventions and may properly be restricted. Applicants hereby provisionally elect Group I, directed to claims 1-8, for examination. However, the restriction requirement is traversed. It should be noted, the Commissioner may statutorily require the election of inventions "If two or more independent and distinct inventions are claimed in one application." In the instant case the Examiner is alleging that the inventions of Groups I and II are distinct, although absolutely no showing of such distinctness has been made.

The Examiner's attention is directed to 37 C.F.R. 1.141(b) where allegedly different classes of inventions may be included and examined in a single application provided they are so linked as to form a single inventive concept. This is exactly the type of case for which the rule was promulgated, i.e., to avoid burdensome and unnecessary restrictions. It is also asserted that the requirement to restrict the present application would be an unnecessary burden upon the Applicants and the Examiner's failure to follow the mandates of the statute and regulation would be a denial of due process. For these reasons it is respectfully urged that the restriction requirement be rescinded.

The examiner has rejected claims 1 and 3-5 under 35 U.S.C. 102 over Langley. Applicants respectfully assert that this ground of rejection has been overcome by the

instant amendment, which is supported throughout the specification and specifically on page 3, lines 2-4; page 4, lines 3-5; and page 5, lines 11-13.

The present invention relates a reactor/heat exchanger cooler assembly for the oxidation of ethylene to form ethylene oxide. The claims require a reactor and heat exchanger cooler assembly which is comprised of a tubular reactor having an upper inlet head and a lower outlet head, reaction tubes packed with catalyst within said reactor supported by an inlet end tube sheet and an outlet end tube sheet, a tubular heat exchanger having an upper end and a lower end, and comprising upper and lower end tube sheets supporting tubes within said exchanger, the upper end of said heat exchanger being *integrally affixed around an opening of the reactor lower outlet head* thus forming an integral structure with the reactor, said opening of the reactor lower outlet head being for the passage of reaction gases from the reactor to said exchanger and through tubes in said heat exchanger whereby said reaction gases are cooled by indirect heat exchange with a heat exchange fluid introduced into said heat exchanger.

Langley also relates to a process of producing ethylene oxide. Their process is conducted using an apparatus which contains some common components, such as cooling tubes and packed beds, with the present invention as well as those previously known in the art. However, it is submitted that Langley not only *fails to teach* each aspect of the present claims as amended, but also that Langley expressly *teaches away* from the present invention.

According to the presently amended claims, the inventive assembly's heat exchanger has an upper end which is *integrally affixed around an opening of the reactor lower outlet head*, such that the heat exchanger thus forms an integral structure with the reactor. Such is not taught by Langley. Rather, Langley directly teaches away from the present invention by disclosing a reactor 1 and a tube cooler 11 which are present as *separate structures attached by a pipe 10*. This contradicts the teachings of the present claims. As shown in the present Fig.1, the inventive structure is in the form of a single integral unit. The present specification (on p.4 lines 12-16) explicitly states that the structure of the

present invention *differs* from conventional practices where a reactor and separate external heat exchanger are connected via a conduit. Thus, it is urged that the present invention is clearly patentably distinct from Langley.

Furthermore, it can be clearly seen in Langley that a *lower* end of their reactor 1 is attached to a *lower* end their tube cooler 11, while the present claims require the *upper end* of said exchanger being integrally affixed around the reactor's *lower outlet head*. This shows a further distinction between the apparatuses Langley and the presently claimed invention. For the above reasons it is respectfully urged that the 35 U.S.C. 102 rejection should be withdrawn.

The examiner has rejected claim 7 under 35 U.S.C. 102 or 103 over Langley. Applicants respectfully submit that this ground of rejection should be withdrawn. The presently amended claim 7 relates to an assembly of claim 1, wherein the heat exchanger is welded *around the opening of the reactor lower outlet head*. As stated above, Langley fails to disclose this feature of the present claims. Thus, it is respectfully urged that this ground of rejection be withdrawn.

The examiner has also rejected claims 1, 3-5, and 8 under 35 U.S.C. 103 over Langley. The examiner states that it would be obvious for one skilled in the art to formulate the present invention upon a reading of Langley. Applicants respectfully urge that this is not the case, since key features of the present invention are not taught or suggested by this reference.

The arguments against Langley from above are repeated and apply equally here. Specifically, the presently amended claims require a heat exchanger having an upper end which is integrally affixed around an opening of the reactor lower outlet head. This feature is *not* taught by Langley. Rather, Langley discloses a reactor 1 and a tube cooler 11 which are present as *separate structures attached by a pipe 10*. This directly contrasts the teachings of the present invention.

Langley further fails to teach the inventive apparatus wherein the *upper end* of the exchanger is integrally affixed around the reactor's *lower* outlet head. Still further, the present invention *differs* from conventional practices, such as Langley's, where a reactor and separate external heat exchanger are connected via a conduit.

In addition, the configuration of the present apparatus with integral heat exchanger serves to *limit the formation of aldehydes* (see p.1, lines 14-19). In contrast, Langley's apparatus teaches the affirmative formation of aldehydes, followed by subsequent conversion of these aldehydes to more ethylene oxide (see column 1, lines 29-41).

For all of the above reasons, it is urged that one skilled in the art would not have been inspired to devise the presently claimed invention upon a reading of Langley. Thus, is respectfully requested that the 35 U.S.C. 103 rejection be withdrawn.

The examiner has rejected claim 2 under 35 U.S.C. 103 over Langley in view of Ozero or Sawada. Applicants respectfully submit that this ground of rejection should be withdrawn.

The examiner takes the position that Langley teaches each feature of the presently claimed invention except for the use of water as a cooling fluid. He attempts to fill this void by citing Ozero or Sawada for teaching ethylene oxide reactors which use water as a coolant. It is respectfully urged that the examiner's use of these references is not well taken.

The arguments against Langley are repeated from above and apply equally here. That is, Applicants urge that Langley fails to teach a structure wherein the heat exchanger has an upper end which is *integrally affixed around an opening of the reactor lower outlet head*. Langley also teaches away from the present invention by having the *lower* end of their reactor 1 attached to a *lower* end their tube cooler 11. Furthermore, Langley's process/apparatus fails to limit the formation of aldehydes.

Regarding Ozero and Sawada, these references certainly relate to ethylene oxide reactor vessels, and each teach the use of water as a coolant. However, it is submitted that there is *nothing* in these cited references which would lead one skilled in the art to combine either of Ozero or Sawada with Langley. In fact, neither reference teaches a structure which *would or should* be combined with Langley in an effort to devise present invention. For instance, neither Ozero nor Sawada teach or suggest an assembly having a tubular reactor having reaction tubes supported by an inlet end tube sheet and an outlet end tube sheet, and having a tubular heat exchanger *with its own upper and lower end tube sheets* supporting tubes within the exchanger. It is urged that one skilled in the art would not have been inspired to combine the teachings Ozero or Sawada with Langley as the examiner suggests. It is further submitted that a hypothetical combination of Langley with Ozero or Sawada would still fail to obviate the present claims, for the reasons stated above. Thus, it is submitted that a prima facie case of obviousness has not been made, and that the 35 U.S.C. 103 rejection should be withdrawn.

The examiner has further rejected claim 6 under 35 U.S.C. 103 over Langley in view of Sapoff. Applicants respectfully submit that this ground of rejection should be withdrawn.

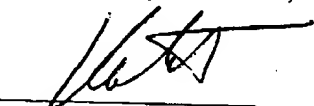
The examiner takes the position that Langley teaches each feature of the presently claimed invention except for the reaction tube dimensions required by claim 6. He attempts to fill this void by citing Sapoff for teaching such reaction tube dimensions. Still, Applicants respectfully submit that the present invention still fails to be obviated by this combination.

Indeed Sapoff relates generally to tubular reactors, and mentions tubes within the size ranges of claim 6. However, regardless of any size or shape of reaction tubes which the examiner borrows from Sapoff, it is urged that the presently claimed assembly is not taught or suggested by Langley. The arguments against Langley are repeated again from above. Specifically, it is urged that Langley fails to teach a structure wherein the heat exchanger has an upper end which is *integrally affixed around an opening of the reactor lower outlet head*. Langley also teaches away from the present invention by having the

lower end of their reactor 1 attached to a *lower* end their tube cooler 11, and Langley further fails to limit the formation of aldehydes. Again, for all of the above reasons, Applicants respectfully urge that Langley fails to obviate the present claims, and it is requested that the 35 U.S.C. 103 rejection be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,



Richard S. Roberts
Reg. No. 27,941
P.O. Box 484
Princeton, New Jersey 08542
(609) 921-3500
Date: August 4, 2005

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office (FAX No. (571) 273-8300) on August 4, 2005.



Richard S. Roberts
Reg. No. 27,941

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

For the application of
BARRY MILLER, JR.

Re: Chemical Reaction System

Examiner: Barbara A. Ridley

FAX COVER SHEET

TO: Barry Miller, Jr.
P.O. Box 1450
Albuquerque, NM 87103-1450

FAX NO.: (571) 273-8700

FROM: Roberts & Roberts
Reg. No. 27941
P.O. Box 484
Princeton, New Jersey 08540
(609) 921-1360

DATE: August 4, 2005

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EXAMINER: Barbara A. Ridley
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